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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Hummingbird Moth

See Page 127

A SCIENCE SERVICE PUBLICATION

PUBLIC HEALTH

Food and Drug Danger

Congressional debate on new factory inspection law seen as limiting Food and Drug Administration authority, particularly in drug field.

➤ FOODS WE buy at the grocery and medicines we get at the drug store may not be so clean, safe or pure in the future as they have in the recent past.

Our Food and Drug Administration may not be able, in the future, to give us all the protection we want. This lack of protection, if it develops, will come as a result of reduced appropriations and because a law requested by FDA did not go far enough.

FDA asked Congress for a law giving its inspectors clear right to enter and inspect food and drug manufacturing plants, with or without the owner's permission, so that they could see whether the plant was complying with the law and producing safe, clean, pure products.

FDA inspectors had been doing this until a Supreme Court decision last fall, called the Cardiff decision, declared that the law giving this authority was too vague and contradictory to be enforceable.

During the closing days of its last session Congress passed a law which gives this factory inspection right to FDA. But in debate on the floor, a number of members declared the bill did not require showing various kinds of plant and shipping records to the Food and Drug inspectors. These records include prescription files of retail drug stores, formula files, complaint files, shipping records and personnel files.

If manufacturers and the courts follow this interpretation, FDA expects to have a much harder time getting evidence that a particular food or drug is dangerous or worthless, or that a druggist is selling dangerous drugs without prescriptions as required by law.

Examining the personnel file of a drug plant employee may seem unimportant for protection of your health. When you buy medicine for your sick child, you do not care whether the control chemist in the plant that made the medicine is divorced or single or male or female. But you do expect that he knows enough about chemistry and chemical and drug manufacturing to be able to keep good control over the production of the medicine you get for your child or yourself.

FDA is interested in how much education that control chemist has, whether he is only a high school graduate or someone with the necessary advanced training for his important job.

Shipping records can be more important than the average person realizes. Even in the most careful drug manufacturing plant, mistakes can be made in processing one or more batches of a drug. That mistake may not be discovered until the drug has gone onto the shelves of many drugstores and hospital pharmacies throughout the nation.

The mistake may first be discovered only after one or several persons who got the drug have been made seriously ill. Then the wires from FDA headquarters in Washington grow hot with "Stop That Drug" messages.

The normal and quickest way to do it is for the FDA inspector to go immediately into the manufacturing plant, look at the shipping records, and send stop messages to those drug stores or hospitals that got the defective product.

Without the right to see these records, they cannot be sure of quickly tracing all shipments.

Examination of laboratory control records gives FDA inspectors a chance to see whether proper safety precautions are being taken at each stage of manufacture of a food or drug. A mistake of one decimal point in following a drug formula could kill a lot of people.

Since a plant may manufacture several thousand products, the inspector obviously cannot stay around for months waiting to observe their production. Nor does he need to, if he can see plant records showing that formulas are carefully recorded and followed, and that laboratory tests are made of both the ingredients and the finished products to make sure that safety and purity standards are adhered to.

Members of Congress, pressured by trade groups and the rush of adjournment, may not have learned about all these details in the work of the Food and Drug Administration. They may not have known that the Durham-Humphrey law they enacted to cut down large scale illicit sale of barbiturates and other dangerous drugs does not carry inspection authority.

It was assumed when this law was written that FDA had such authority. But the Supreme Court decision took the authority away and the new law, as interpreted by Congressmen, also denies it.

If FDA cannot inspect the files of retail druggists, the only way they can enforce the Durham-Humphrey law is by going into a drug store and trying to buy a prescription item without a prescription.

If they succeed, they may be able to get a court decision that the druggist is violating the law. But they will not be able to back their case with information from the druggist's own records comparing the quantities of the drugs received with those dispensed on prescription, as they have heretofore been authorized by law to do.

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• RADIO

Saturday, August 29, 1953, 3:15-3:30 p.m., EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Herbert Conway, associate professor of clinical surgery, Cornell University Medical College, and attending surgeon in charge of plastic surgery at the New York Hospital, will discuss "Plastic Surgery."

TECHNOLOGY

New Process Yields Oil Formerly Unrecovered

➤ SOME OF the four billion barrels of crude oil now lying unused underground can be recovered by the new process of burning the oil sands deep under the surface. The heat thins the heavy, previously unrecoverable oil, and then it can be pushed out of the well by air pressure.

The process, called "oil recovery by in-situ combustion," was developed by engineers at the Socony-Vacuum Oil Company research laboratory, Dallas, Tex. Laboratory experiments have shown that less than 15% of the oil is actually consumed by fire. Field tests of the method are now being made in Oklahoma by Carl S. Kuhn and Robert L. Koch, who led the experimental work.

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ENTOMOLOGY

Insects Gnaw Away At Summer Crops

➤ FARM LOSSES to insect pests are increasing as grasshoppers, boll weevils, aphids and other six-legged varments gnaw into maturing summer crops.

The boll weevil situation continues serious in the cotton states, reports the U. S. Department of Agriculture. In North Carolina, 68 untreated cotton fields checked for boll weevils showed 100% infestation. Of 176 fields treated against boll weevil, 163 were found to be infested.

Similar reports of high infestation came from other areas of the South.

Grasshopper damage has stepped up in several states. Severe damage to early corn and alfalfa due to grasshoppers is reported from Maryland. Tennessee, Illinois, Missouri, Kansas, Nebraska and New Mexico have grasshoppers in dangerous numbers.

In the widely separated potato-growing states of Maine and Washington, aphids are striking at that crop. In two Washington counties, 7,000 acres of late-crop potatoes are threatened by growing aphid populations, while aphids have already gotten out of control on 2,000 acres in the vicinity.

The corn-belt area is feeling the bite of corn rootworms, as adults emerge in large numbers there.

Tobacco pests—flea beetles, hornworms, budworms—are doing their worst to that crop, especially in the Bright Leaf belt around North Carolina.

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PHYSICS

Which of Three H-Bombs?

No information is available concerning the type of "fusion" bomb developed by the U.S. or by Russia. Several kinds are possible.

➤ ASSUMING THAT Russia does have the hydrogen superbomb (and we must credit Soviet science with the capability), the question is what kind of a hydrogen bomb do they have? What kind do we have?

For there are several possible "fusion" bombs that operate by what is called "thermonuclear reactions."

They are all hydrogen bombs, but there are three kinds of hydrogen: 1. The ordinary and plentiful kind. 2. Deuterium, the double weight kind, rare but occurring in nature. 3. Tritium, the triple weight kind that is radioactive and has to be manufactured.

From highly secret tests at Eniwetok, our scientists probably know now which kinds can be used for superbombs. For there is little doubt that we have exploded one or more hydrogen bombs.

Most of those engaging in more or less informed guessing believe that tritium is the superbomb material of choice. Two atoms of tritium (H^3) brought together with sufficient violence would fuse into and form a helium atom (He^4) and give off two neutrons. Neutrons are the uncharged atomic particles that trigger the atom bomb.

There would be a terrific release of energy due to the fact that mass of the two tritiums is slightly more than that of the helium and the neutrons, and that this mass is converted into energy.

But two deuterium atoms similarly thrown together should also fuse, giving in one reaction a tritium atom and an ordinary hydrogen atom, and in an alternate reaction a mass three helium atom and a neutron. Both would release large energy.

There could also be reactions between atoms of deuterium and tritium, which should be violently explosive. Participation of ordinary hydrogen would be likely to slow things down too much.

All the hydrogen bombs presumably would need extremely sudden and high temperatures to be kicked off. A fission bomb of uranium 235 or plutonium (the conventional atomic bomb if anything atomic can be called conventional) is used to trigger a hydrogen bomb. It creates sun-like temperatures, a million degrees or so.

The speed of interaction of the hydrogen material is all important. For the violence of the explosion will throw the material apart and it must do its combining in a few millionths of a second.

The hydrogen bomb is cheaper and more practical from a production standpoint if its material is deuterium, or double-weight hydrogen. This isotope of hydrogen is separated from water, in which a small amount occurs. The process is somewhat like the way in which the fissionable uranium, isotope 235, is separated from the most plentiful uranium 238 with which it occurs in the natural deposits. Deuterium can be obtained without use of materials that enter into the production of fission or ordinary A-bombs.

But the production of tritium is a drain on the uranium supply. It must be manufactured, probably from lithium metal, by bombardment with neutrons. The fissioning of uranium, or plutonium made from uranium, is the only practical source of neutrons for this purpose. This would be done in an atomic reactor of the same sort that is used to make plutonium, by bombarding uranium 238 with the neutrons from a slowed-down reaction such as occurs in the atomic fission bomb.

Tritium for hydrogen bombs can be made only at the sacrifice of atomic bomb production and a large sacrifice of total explosive power. It is necessary to forego some of the total punching power to obtain the super-punch of a bomb that is perhaps a thousand times that of the Hiroshima bomb, a superbomb capable of devastating vast territory.

If deuterium can be made to explode, hydrogen bomb production is not dependent upon the uranium supply except to provide the triggering fission bombs.

Tritium is radioactive and half of its disintegrates in about 11 years. Making it and stockpiling for use in the distant future is wasteful because of this natural disintegration.

All of the hydrogens as elements are gases which are unhandy to use, but they can be combined with other elements into solids. Plutonium tritide or plutonium deuteride would give both the fissionable and the fusionable atomic energy elements in the same compound. Perhaps they are packaged in this way for the hydrogen bomb.

A hydrogen bomb would probably be detectable by the large amount of radioactive carbon created in the gigantic explosion. The nitrogen in the atmosphere bombarded by neutrons given off by the superbomb would be turned into carbon 14, just as the cosmic rays create continuously this kind of carbon in very small amounts in the upper atmosphere. This radioactive material comes down to near the earth's surface and can be used to date things that contain carbon.

If a hundred or so superbombs were exploded, they might so poison the atmosphere with radioactivity as to affect human life, increasing the cancer incidence. If cobalt were added to the hydrogen bomb with fiendish intent, the radioactive cobalt-60 produced and spread in the air would

NAVY'S SEA-DART—The first combat-type aircraft to use water skis for improved rough water take-off and landing operations is the Navy's XF2Y-1 Sea-Dart, experimental delta-wing jet fighter shown here. Retracted, the hydro-skis disappear into the hull to give the plane a missile-like look. *(See SNL, Jan. 3, p. 6.)*

have the effect of so much deadly radium. Life itself on earth would be jeopardized.

When and if the government tells what has been discovered by the superbomb research and development, we shall be able to form a better judgment as to the hazards of superbombs.

Defense of the civilian population is little changed by a merely bigger bomb. As the bombs become more powerful, the possibility of making peace and keeping out of war with the Soviets becomes more important.

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CYTOLOGY

New Way to Study Cell-Virus Battle

➤ THE BATTLE between body cells and invading disease virus can, it is hoped, be watched and recorded in moving pictures by a new method devised by Drs. Ralph Buchsbaum and Kenneth Wertman and graduate students Evelyn Dwyer, Ronald Gillette and Brother Joseph Kuntz at the University of Pittsburgh.

Body cells are kept alive under a microscope inside a plastic incubator. The incubator keeps the cells at the temperature needed for life and growth, and nourishment is given through special fluids that flow under suitable controls over the cells.

By changing the composition of the fluid or by adding to it a specific virus, the scientists hope to be able to see under the microscope and record with their movie camera the reactions of the cells to changes in nourishment or under attack by disease viruses.

At present chick embryo tissue is under study. Later the scientists hope to study human tissue cells. The project has financial support from the Office of Naval Research, the Atomic Energy Commission and the Army Chemical Center.

Dr. Buchsbaum will go to Rome, Italy, in September, to report on the project before a meeting of the International Congress of Micro-Biology.

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PUBLIC HEALTH

Alert on TB Meningitis

➤ A WARNING to parents to be alert to symptoms of tuberculous meningitis in their children is given by the National Tuberculosis Association. In this kind of tuberculosis, the TB germs attack the meninges, which are the membranes covering the brain and spinal cord.

Before the discovery of streptomycin, this form of TB was practically 100% fatal. Even with this drug, the disease is often fatal and always serious. As in other forms of tuberculosis, early treatment is important to saving the patient's life.

Young children who get tuberculosis from a grown person frequently develop the meningitis form of the disease. For that reason, parents should be particularly alert to early symptoms of the disease if their children have been in contact with a grown-up who has tuberculosis. Grown persons also may develop this form of TB, and it may be a complication of pulmonary tuberculosis, spreading to the meninges from the lung.

The early symptoms of tuberculous meningitis do not seem particularly significant and may not arouse suspicion. The child may be irritable, have a low-grade fever, and may have difficulty in feeding, with vomiting on occasion. Later, the child may slip into a comatose (unconscious) or semi-comatose state. The child who has convulsions may be fortunate, for the family is shocked into action and a doctor is consulted.

The first person to notice such symptoms in the child should be aware of the possibility of tuberculous meningitis.

About 75% of the time, one specialist says, the adult contact from whom the child caught tuberculosis was in the immediate family. When there is a question about tuberculous meningitis in a child but the diagnosis is not immediately certain, members of the family should be X-rayed. Examination of the family may not only uncover tuberculosis in the adult but aid in the diagnosis of the child's ailment.

One child brought to this specialist had a father with only a slight "cigarette" cough. But when he was X-rayed a huge cavity was found in his lung. His wife had tuberculous pneumonia. Neither of them had seen a physician. The child died with tuberculous meningitis within two weeks.

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PHARMACOLOGY

New Drug Stops Coughs

➤ GOOD RESULTS with a new synthetic drug that stops coughing spasms without making addicts of its users are reported by Drs. Leo J. Cass and Willem S. Frederik of Harvard Medical School in the *New England Journal of Medicine* (Aug. 12).

The new drug is known chemically as dextromethorphan hydrobromide. (See SNL, Jan. 3, p. 7.)

The drug was made and is still in the process of development and investigation by scientists in the Nutley, N. J., laboratories of Hoffmann-La Roche, Inc. Chemically, it is the dextro isomer of the powerful synthetic pain-killer, Dromoran. But it lacks the pain-relieving ability of Dromoran as well as addiction-causing feature.

Drs. Cass and Frederik made a 45-day test of the new drug involving 11,000 clinical observations on patients at the Long Island Hospital, Boston, and the Cambridge Tuberculosis Sanitarium, Cambridge, Mass. They found the drug twice as effective as codeine on a weight basis. That is, four milligrams of the new drug were one-half as effective as 17 milligrams of codeine sulfate, now used to control coughing.

Since the new drug lacks unpleasant side-effects, such as nausea, drowsiness and constipation, and has no addiction liability, it would not matter if doses equal to or greater than codeine were needed to control cough.

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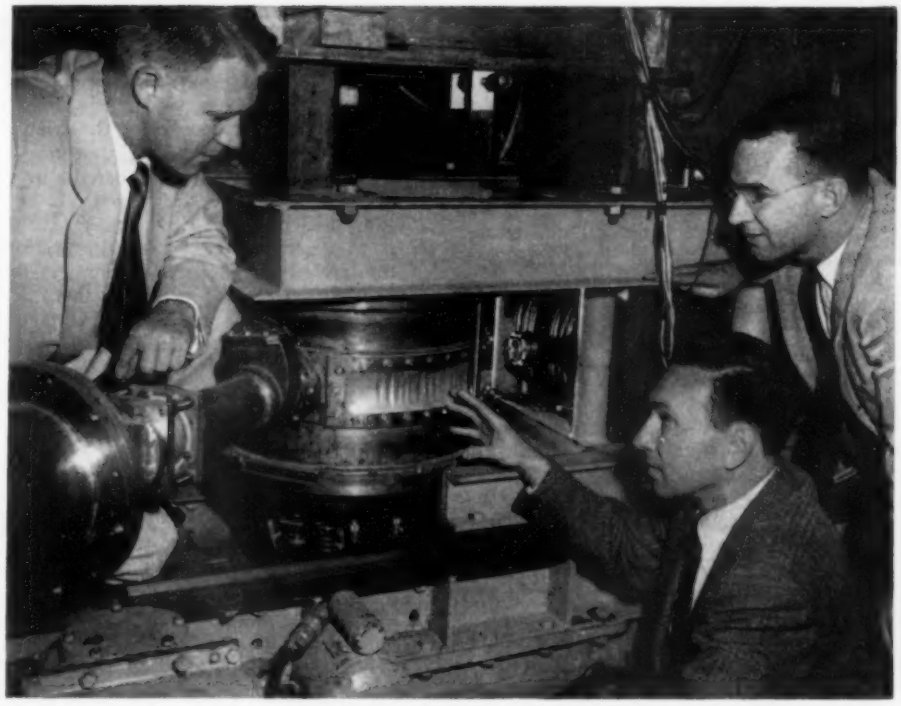

ELECTRON SCATTER APPARATUS—Using the equipment shown here, these scientists, Harry R. Fechter (left), Dr. Robert Hofstadter (center) and John A. McIntyre (right) of Stanford University, have probed deeper into the atomic nucleus than man has ever gone before.

PHYSICS

Dense Core for Matter

➤ THE HEART of matter, the nucleus of the atom, is not as hard and solid as previously believed. But the core of the nucleus is five to ten times denser than previously predicted, and about 130 trillion times as dense as water.

The extremely minute area within the atom was probed by the world's most powerful electron linear accelerator combined with a high-energy electron scattering apparatus, designed by Dr. Robert Hofstadter, assisted by Harry R. Fechter and John A. McIntyre, all of Stanford University.

Considerable space was found between the particles in the nucleus where once scientists thought a uniformly dense solid existed. This suggests that it may be possible to compress the heart of matter, where most of the mass is concentrated.

The particles within the nucleus are so densely crowded at the core that the structure appears to be solid, but they gradually thin out almost into nothingness toward the edges. The average density is about the same as previously predicted, but the core is such that a mere drop of water of that density would weigh about two million tons.

Such conclusions were drawn by the Stanford scientists from elastic scattering of electrons from nuclei at energies of 135,000,000 electron volts. A double-focusing spectrometer magnet was constructed that bends the high-speed electrons so that their effects can be measured.

The apparatus allows distinguishing particles within the nucleus only two one-hundredths of a trillionth of an inch apart, they report in the *Physical Review* (July 15).

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EDUCATION

Radio-Listening Indians Learn English From Film

➤ HOW TO teach Indians English when they cannot even read in their own language is the problem faced by Cornell University scientists on the Navaho reservation at Fruitland, N. Mex.

Navahō Indians need English to do their shopping, to talk to Government agents, few of whom speak Navaho, to listen to the radio now becoming popular, and to keep their jobs off the reservation.

There are, however, no English language textbooks in Navaho. Anyway they would be useless because the Indians cannot read their own language.

Solution of the anthropologists who tackled this problem lies in film strips with tape-recorded dialogues in Navaho and English. Photographs are taken in Fruitland and show everyday scenes and events.

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MEDICINE

Anti-Malaria Drug Helps Clear Scaly Skin Disease

➤ ONE OF the modern anti-malaria drugs, chloroquine diphosphate, can help clear up a scaly skin disease called discoid lupus erythematosus.

After four months of treatment, nine of 14 patients were greatly improved, three others showed some improvement and two showed no change in their condition, Drs. Leon Goldman, Donald P. Cole and Robert H. Preston of the University of Cincinnati College of Medicine report to the *Journal of the American Medical Association* (Aug. 8).

Some toxic symptoms from the chloroquine developed but these were less than with quinacrine, or atabrine, another anti-malaria drug previously used successfully to treat the condition.

The skin disease is a superficial inflammation marked by disk-like patches with raised reddish edges and depressed centers covered with scales or crusts. These fall off leaving dull-white scars.

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ETHNOLOGY

Primitive Indians Are Awed by Compass

➤ A NAKED people using only the most primitive implements and living a Stone Age existence in the jungles of Brazil have been found by Dr. Edward M. Weyer Jr., anthropologist and editor of *Natural History*, who has just returned from a visit to the Mato Grosso.

Armed with camera and tape recorder instead of gun, Dr. Weyer found that these primitive people who had never before seen a white man were very friendly and welcomed him warmly. He was allowed to sling his hammock with the family of the chief. He was entertained with a continuous round of ceremonials and dances, many of which he recorded on film and sound tape. He traded trinkets from New York for an elaborate headdress made of red and yellow macaw feathers, ceremonial masks, bows and arrows and musical instruments.

Although these Camayura people, who live on the shores of a magnificent lake at the headwaters of the Xingu River, have a reputation for being very fierce and hostile, Dr. Weyer found that, when they are treated with respect, they are friendly and hospitable and posed for his pictures willingly.

He did have some bad moments, Dr. Weyer admits, when he tried in his limited vocabulary in their language to explain to the Camayuras the gyrations of a compass when they saw one for the first time. They thought the movement was due to supernatural causes.

Dr. Weyer also visited and made friends with a band of Chavantes, another tribe said to be among the fiercest and most primitive on earth.

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MEDICINE

Advice on Shampoos

➤ DOCTORS ARE sometimes asked whether frequent shampoos are harmful to hair and scalp, or what kind of soap or shampoo should be used and whether it hurts the hair to wet it when combing it.

Answers to these and some other questions about hair and shampoos are given in the *Journal of the American Medical Association* (Aug. 8) as follows:

Washing the hair will not itself result in hair damage. But if strong cleansing agents are used consistently, the hair and scalp may become excessively dry.

"Years ago, cleansing agents were more often alkaline than they are today, and inferior shampooing results were not rare," the consultant stated.

"There are few persons who find it necessary to wash the hair more than twice a week. The average person in a city may require shampoos once a week. Wetting the hair for grooming purposes is not harmful.

"The type of a detergent used in a particular shampoo is a trade secret, unless the manufacturer wishes to disclose it. Some shampoos contain both a soap and a synthetic detergent product. The most satisfactory criterion for determining shampoo action is to experiment with several reputable brands until one is found that suits the individual needs.

"This experimentation will not result in serious hair damage. The most that will occur is temporary excessive dryness and such cosmetic disadvantages as inferior manageability and hair gloss.

"In general, synthetic detergents are efficient cleansers, and some would not be suitable for any but extremely oily hair; however, by the addition of certain chemicals, cleansing ability can be decreased, and a product can be produced that is satisfactory for dry and average hair.

"When excessive dryness of the hair persists despite a change in shampoos, other causes should be investigated. Over-processing during permanent waving is a common cause of brittleness and dryness of hair. The possibility of organic causes also should be considered."

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PHYSIOLOGY

Hunger Chills Stomach

➤ HUNGER CHILLS the stomach. Eating warms it up again. Studies showing this in both normal persons and stomach ulcer patients are reported by Drs. H. B. Benjamin, Marvin Wagner and Walter Zeit of Marquette University School of Medicine, Milwaukee.

In the normal persons, men and women medical students, the temperature inside the stomach ran consistently one to three degrees Fahrenheit higher than the temperature inside the mouth. When they first felt hungry, about 11 a.m., the temperature inside the stomach took a sharp drop. Shortly after eating it went back to its former level.

The same was true of the stomach ulcer patients. Their stomach temperatures dipped sharply when they had the hunger pangs typical of stomach ulcers, and returned to normal after eating. An exception was one patient who had learned to eat small quantities of food almost constantly. His stomach temperature was lower than that inside his mouth, and varied only in a one degree range between 98 and 99 Fahrenheit during the 24 hours of the test.

The temperature drop in hunger, the doctors believe, is due to the fact that muscular contractions of the stomach in hunger stop the blood flow, and lead to a lack of oxygen and consequent lowering of metabolism in the stomach. A lowered metabolism means the body fires are burning slower. These changes, the doctors point out, can occur not only generally but separately in various regions of the body.

To measure temperatures inside the stomach, they made a special thermopile that could be passed through the nose into the throat and then swallowed. A weighted balloon at its end made possible the moving of the thermopile from place to place within the stomach. Details of the construction of the thermopile are reported in *Surgery, Gynecology and Obstetrics* (July).

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PHYSICS

Warning Radar Looks Into 300,000 Cubic Miles

➤ RADAR OF the type that is used to warn of approaching enemy planes can look into 300,000 cubic miles of space, Dr. Vannevar Bush, president of the Carnegie Institution of Washington and wartime head of the U. S. Office of Scientific Research and Development, explains in an analysis of radar development issued in connection with a series of books reporting the war achievements of the Radiation Laboratory at the Massachusetts Institute of Technology. (See SNL, July 25, p. 60.)

"It is as efficient on a moonless night as on the brightest day," Dr. Bush explains, "and the obscuring effects of storms and fogs, which have beset navigators from earliest times, hold no problems for it. It not only revealed the hiding places of the enemy's ships and planes, but it identified our own planes in darkness and in battle and guided many a flyer back to the safety of his own base.

"Now an instrument which can accomplish such wonders is necessarily a complex mechanism. Although its development spreads over the two decades of the twenties and thirties, the period of greatest progress occurred during the war under the impetus of strategic and tactical needs.

"Radar, which is the ear-catching word coined to describe the processes of radio detection and ranging, was one of the greatest tools of the recent war, but it also has vast usefulness in the postwar world and its powers are happily extensible to many problems of modern navigation."

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MEDICINE

Deep Sleep Treatment Succeeds in Epilepsy

➤ SUCCESS WITH a new, deep sleep treatment for epilepsy is announced by Drs. Tracy J. Putnam and Sanford F. Rothenberg of Beverly Hills, Calif., and the Cedars of Lebanon Hospital, Los Angeles, in the *Journal of the American Medical Association* (Aug. 8).

The treatment was given to 25 patients who had not been helped by standard anti-convulsion drug treatment. All 25 were relieved of seizures for a long period, although three subsequently relapsed. A second course of the deep sleep treatment has given one of these freedom from attacks for four years, has kept the attacks under control in a second for over a year and has moderated the seizures in the third.

The treatment consisted in putting the patient into a profound state of unconsciousness by giving massive doses of the anti-convulsion drug, diphenylhydantoin. If this did not produce a comfortable relaxation, either paraldehyde or phenobarbital was given as an additional relaxing agent. The treatment included doses of glutamic acid and small, hourly inhalations of a carbon dioxide-oxygen mixture.

A special diet was prescribed, and when the patient became too sleepy to eat or drink, a sugar solution was injected into the veins to provide some nourishment and water. Antibiotics were also given to prevent infection. Continuous special nursing care was provided. Anti-convulsion drugs were given when the patient awoke and for home use following recovery.

The period of sleep usually lasted four days. The entire treatment lasted about two weeks.

"While no patient in this series died, there certainly is some potential risk in the treatment," the doctors pointed out.

Even in the most successful cases, the good results did not show immediately. In some there was even a period when the patient seemed worse. In one case this lasted for six weeks. In some cases, also, a single convulsion may occur after three months and then no more.

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GENERAL SCIENCE

Kinsey's Data on Females

The long-awaited report, "Sexual Behavior in the Human Female," reveals that married women are more faithful than men.

Miss Stafford examined pre-publication proofs of this book and discussed the findings with Dr. Kinsey and his co-authors in Bloomington, Ind.

By JANE STAFFORD

➤ MARRIED WOMEN are more faithful than married men. Only about half as many women as men commit adultery during their married lives.

This is the case, at least, for those men and women who contributed histories to Dr. Alfred C. Kinsey and associates of Indiana University for their studies of human sexual behavior.

Sexual activities of women, in and out of marriage, is the subject of the long-awaited second Kinsey report, to be published shortly in a book, "Sexual Behavior in the Human Female," by Dr. Kinsey and Dr. Wardell B. Pomeroy, Clyde E. Martin and Dr. Paul H. Gebhard (W. B. Saunders Company).

Of the married women in the study, 26% of them by 40 years of age had been unfaithful to their husbands. This contrasts with the 50% ("about half") of unfaithful husbands reported in the earlier Kinsey study.

Between the ages of 26 and 50, between one in six and one in ten married women were unfaithful. The figures may be higher, Dr. Kinsey says, because some of the wives may have covered up this part of their sexual activities.

Periods of infidelity of wives are sporadic. By the age of 40, the wives are being unfaithful once in two or three weeks if the number of occasions are averaged over a year. But many of the unfaithful wives were faithful for long periods. The periods of infidelity might come during a vacation or while they or their husbands were on a trip away from home.

One difference among women, which showed up in other sexual activities, related to when they were born. Of wives born before 1900, 22% instead of 26% were unfaithful by age 40.

Most of the men with whom the wives committed adultery were married men of about the same age as the women. In some social groups, there was "wife swapping" with both husbands and wives knowing about the activity. In some cases, husbands urged their wives to infidelity either for money or with the hope of gain in social prestige, for example, to please a man who might give the couple entry to a higher social level.

About half the husbands of unfaithful wives knew or suspected the infidelity, according to the wives. The wife's infidelity caused serious trouble, sometimes leading to divorce, in 42% of the cases, but no trouble in 42%. In the other cases, the husband did not know or suspect the unfaithfulness.

Men rated their wives' infidelity as a primary factor in divorces twice as often as women rated unfaithful husbands as the primary factor leading to divorce.

But one factor that seems of prime importance in causing wives to be unfaithful is the difference between men and women in ages of sexual responsiveness. Our educational and social patterns work against the monogamy we prefer by making many, if not most, husbands too old sexually for their wives.

By the time a woman reaches her late forties, her slightly older or even the same aged husband is way past the prime of his capacity for sexual activity. But the woman does not reach the stage of decline in sexual activity until her mid-fifties or even sixties. As the frequency of marital intercourse drops when the wife is still in her forties, she is likely to turn, at least on occasions, to other men.

The frequency of intercourse between husbands and wives is set largely by the husbands. Married women who talked about this to Dr. Kinsey said that there was remarkable regularity in the frequency of intercourse. For the average woman married in her late teens, the frequency was 2.8 times per week. By the time she was 30 this had dropped to 2.2 per week and by age 40 to 1.5 per week. Older women, 50 and 60 years, had intercourse once a week and once in 12 days on the average.

In each age group to age 40, however, there were some married women reaching orgasm (climax) in their marital intercourse on the average four times a day every day in the week. By the age of 50, only two of those interviewed were reaching orgasm seven or eight times a week and none at this age were having orgasm more frequently.

More than 7,500 women told the Kinsey interviewers facts about themselves they would not tell even a sister or close friend. Dr. Kinsey makes the point that women on the whole do not talk about sex or their sex lives as men do. That explains why much less has heretofore been known about the sexual activities of women and girls.

The present study, however, is based on only 5,940 histories of white females. Another 1,849 have not yet been analyzed.

The ages of the 5,940 women ranged from two to 90 years. Information on the two-year-olds came from their mothers, though many of the older women gave their recollections as far back as age five. Most of them belonged to what Dr. Kinsey calls the "upper educational level."

More than half, 56%, had some college training and 19% had finished college and gone on into graduate work in colleges or universities. Only 17% had gone no further in school than high school, and only 181 women out of the entire group in the present study had never gone beyond grade school.

The amount of schooling the women had, however, made very little difference in their sexual activities. This is one way in which the girls and women differed from boys and men. Among the latter, the amount of schooling made considerable difference in sexual behavior.

The 5,940 women came from all parts of the nation, although fewest were from the Southeast, Pacific Northwest, high plains and Rocky Mountain regions.

Where the girls and women lived, however, made very little difference in their sexual behavior. Most of them were from

ALFRED C. KINSEY—The director of the Institute for Sex Research, Dr. Kinsey, is shown in a working pose.

For your convenience, the Kinsey story is on these four center pages that may be lifted out for filing.

cities and towns and there were slight differences between the urban and rural groups.

Catholic, Protestant and Jewish girls and women were included in the survey as were those with no religious affiliation. Being devoutly religious seemed to make some difference in the sexual behavior of these girls and women, up to a point. But the differences were not related to the particular church or religious group.

The 5,940 women and girls, like the 5,300 boys and men of the previously published study, came from many walks of life. Their occupations ranged from acrobat to YWCA staff, and covered about 200 different kinds of work. Included were such diverse callings as union organizer, minister, poet, policewoman, taxi driver, glass blower, sculptress, prostitute, interpreter, farmer and electrician. The occupations of their fathers were about as varied. But neither their own nor their parents' occupations made any significant difference in their sexual activities, with a few exceptions.

Some Sorts of Experience Help Success in Marriage

➤ PARENTS WHO want their daughters to marry happily and make a success of marriage may want to encourage the girls to have many dates. Some will decide to turn a blind eye on petting, even when it goes on to more than just petting.

The reason is that such experience "may contribute directly to the sexual effectiveness of a marriage."

This is one finding from the study of 5,940 girls and women of all ages, classes and occupations made by Dr. Kinsey and his associates.

"No sort of experience shows a higher positive correlation" with sexual success in marriage than intercourse before marriage, Dr. Kinsey declares.

But he and his staff do not believe that sex is the only factor that determines the success or failure of marriage. On the contrary, he specifically states in the forthcoming book, proofs of which have been shown to me:

"There seems to be no single factor which is more important for the maintenance of a marriage than the determination, the will that that marriage shall be maintained. Where there is this, differences between the spouses may be overlooked or forgotten and minor disturbances may be viewed in a perspective which emphasizes the importance of maintaining the marital union."

"But," he declares, "sexual factors are among those that may contribute to happiness or unhappiness, the maintenance or dissolution of homes and marriages."

The findings of his study "suggest that there may be as many as two-thirds of marriages which will at least on occasion in the course of the years run into serious disagreement over sexual relationships. In a considerable number there is constant disagreement over sexual relationships. In perhaps three-quarters of the divorces recorded in our case histories, sexual factors were among those which led to the divorce."

The histories of the 5,940 girls and women showed not only that those with sexual experience before marriage made a better adjustment in marriage, but that those without such experience were more likely to have marriages that failed.

Actually, almost half the married women in the study were not virgins when they married. About two-thirds (64%) had carried petting or some kind of sexual activity to the point of orgasm (climax), though not all of these had had physical union with a man.

For most, 87%, at least a portion of experience before marriage was had with the man the girl subsequently married. More than a fourth had had such experience ten times or less before marriage. Only 13% had had intercourse with six or more men.

Less than a fourth (23%) of the wives and only a few more of the unmarried women (31%) regretted having such sexual experiences with men before marriage.

Nearly 18% of the women who had such experience while unmarried became pregnant. But, Dr. Kinsey declares, "there is practically no excuse for such a rate today" with modern, effective contraceptive devices.

Venereal disease also, he points out, is no longer significant as a bar to sexual experience without marriage, chiefly because of the ease and certainty with which it can be cured.

The kind of homes the girls and women came from and their educational background made little difference in whether or not they had sexual experience including intercourse with men before marriage. Religious training kept some of them from such activities but not even this stopped all of them. And once a girl had overcome or overthrown any religious scruples, she was no different from any of the others in the frequency of her activities.

One big difference found among women was the decade in which they were born. Among those born before 1900, less than half as many had intercourse with a man before marriage as those born in any subsequent decade.

This difference, found also in petting before marriage, is one of the greatest changes in patterns between the older and younger generations. It reflects changes in attitude started by the teachings of Havelock Ellis and Freud and further developed by the emancipation of unmarried women, especially in America.

The sexual patterns of the "roaring twenties" which so much disturbed the older generation then are still with us, Dr. Kinsey finds. But the older generation is less disturbed by them today because the older generation now is the one that introduced the new patterns.

This is fortunate because the chief damage a girl suffers through heavy petting or intercourse before marriage or both comes from any guilty feelings she may have about it. If extreme, such guilt reaction may damage her marriage later.

Guilty feelings about any kind of sexual behavior, Dr. Kinsey finds, can be more damaging than the behavior itself. The guilt reaction may lead to homosexual behavior or to various types of impotence and frigidity.

Even when not carried to the point of intercourse with a man, extensive petting before marriage provides girls with useful experience, in Dr. Kinsey's opinion. He states:

"It is petting rather than the home, classroom or religious instruction, lectures or books, classes in biology, sociology or philosophy, or actual coitus (intercourse between man and woman) that provides most females with their first real understanding of a heterosexual experience."

"The church, the home and the school," he finds, "are the chief sources of the sexual inhibitions, the distaste for all aspects of sex, the fears of the physical difficulties that may be involved in a sexual relationship, and the feelings of guilt which many females carry with them into their marriage."

Petting experience before marriage gives a girl a chance to learn to adjust emotionally as well as sexually to various types of males, the Kinsey findings suggest. In this way she may become able to choose more wisely the particular man with whom she hopes to make a permanent, till-death-do-them-part marriage.

Kinsey Findings Show Marriage Manuals Err

➤ MOST MARRIAGE manuals need some rewriting. Some of the advice they give young couples about to be married or struggling through the first difficult year of marriage is wrong, Dr. Kinsey stresses.

Many marriage manuals make a mistake in assuming that: 1. girls and women have less capacity than men to respond sexually; 2. there are more areas on the female body that need or respond to caressing and kissing; 3. girls and women are slower to respond than boys and men; 4. girls develop sexually earlier than boys; 5. there are basic differences in the nature of the climax in men and women, and 6. the girl or woman responds with more emotion, or romantic feeling, than the boy or man.

All these ideas are wrong, Dr. Kinsey finds. The advice based on them, stressing the need for long periods of petting and love-making before a woman is ready to go on to climax, is consequently wrong.

These wrong ideas are age old and appear in both ancient and modern marriage manuals. Some of the old English ballads, Dr. Kinsey points out, tell more of the real facts of life than ancient or modern marriage manuals. They describe women who really knew what sexual response is and who called for direct action instead of dawdling.

"It now appears," Dr. Kinsey states, "that the very techniques suggested in marriage manuals, both ancient and modern, have given rise to some of the differences that we have thought were inherent in females and males."

In the past, he points out, both biologists and philosophers confused reproductive function with sexual behavior. They took it for granted that the reproductive organs and particularly the external ones were the only parts of the body involved with either reproduction or sexual behavior. This is not much different than the old belief, still held by some, that sexual responses originate in the heart.

The idea that a person may control his sexual responses if he sufficiently "puts his mind to the matter" is likewise based on a false notion that sexual responses originate in the head.

The truth is, according to Dr. Kinsey, that ability to respond sexually depends on endings of nerves of touch on the body surfaces, the nerves connecting these organs with the spinal cord and brain, nerves which extend from the spinal cord to various muscles and the autonomic nervous system which brings still other parts of the body into action.

The nerves, muscles and their connections are all present at birth in both males and females. Even newborn babies, some of them, are able to and do respond sexually to stimulation of the nerve endings of touch, in other words to caressing and kissing and pressure. This is true for both boy and girl babies. Dr. Kinsey has records of four girl babies under one year of age who under the stimulus of touch responded sexually all the way to orgasm, or climax.

As a little girl grows older, however, she is usually taught to shun physical contact with boys, to avoid having her feelings aroused by them. This process of conditioning results in attitudes and habits which are hard to change, as are any attitudes or habits when a person is older. Then, suddenly, when the girl gets married, she is expected to decondition herself and respond immediately to her husband.

How difficult this may be is shown by the Kinsey finding that some women were unresponsive in marriage for 28 years before they experienced climax in relations with their husbands.

This conditioning may be what has led to the idea that a woman is slower to respond than a man. Actually, though there is tremendous individual variation, the average woman is capable of responding just as quickly and reaches her climax as quickly as a man. Some of the Kinsey findings on self-gratification in women show this.

The advice in marriage manuals that the husband should give his wife time before expecting her to reach her climax, and should use elaborate petting techniques before climax, is likely to have a contrary effect to that intended. It may slow the woman down.

In lower educational groups, where a minimum of time is given to such foreplay, as scientists call it, the woman reaches climax as often as or even more quickly than the more educated woman. For the less educated groups, the woman may need only a couple of minutes, whereas in the higher educational groups, a half hour or hour may be needed.

Marriage manuals make a mistake in not allowing for such differences in women and in not explaining that brief but uninterrupted physical pressures and continued rhythmic stimulation are really what brings a woman to climax.

Frigidity is less among married women born after 1900 than among those born before the turn of the century. Dr. Kinsey does not like the word frigidity because all women are probably capable of reaching a climax in sexual relationships if sufficiently stimulated physically. But among married women born after 1900, more reach a climax in intercourse than among those born before the turn of the century. This Dr. Kinsey says is due to the freer and franker discussion of sex in the younger generation, greater knowledge of the subject including knowledge that orgasm (climax) is possible for a woman, and more petting and intercourse before marriage.

For married couples, Dr. Kinsey points out that the time spent in love-making before climax and the various techniques and positions used can be a matter of the couple's own choosing.

Youth Delinquency Up as Elders Don't Understand

➤ GROWN-UPS WHO believe juvenile delinquency has increased, as many do, can blame the increase on their own failure to understand the nature of young people.

This failure in understanding is relatively recent, Dr. Kinsey points out. Before the last century or so, it was well understood that the teen-agers were the ones who had the greatest sexual capacity. The love affairs of teen-age boys and girls were the theme of the great romances. Helen of Troy was 12 years old when Paris carried her off from Sparta. Tristram was 19 when he met Isolde. Juliet was less than 14 when Romeo made love to her.

"All of these youth, the great lovers of history, would be looked on as immature adolescents and identified as juvenile delinquents if they were living today," Dr. Kinsey declares.

The sexual behavior of young people has not changed much through the centuries. But, as many a teen-ager has complained, the old folks don't understand. Dr. Kinsey says it for them:

"It is the increasing inability of older persons to understand the sexual capacities of youth which is responsible for the opinion that there is a rise in juvenile delinquency."

Although boys reach the peak of their sexual capacity in their mid-teens and girls in the twenties, some boys and girls are capable of being sexually aroused at very early ages. The Kinsey findings justify the statement that sex life can start in the cradle. Included in his records are those of babies under one year responding to the point of orgasm, or climax, by self-stimulation.

About four percent of the 5,940 girls and women who volunteered their sexual histories thought they were responding sexually by the age of five. A few recalled making specific sexual responses to physical stimuli and even to psychologic stimulation as young as the age of three.

Just as grown-ups fail to recognize the sexual capacities of teen-agers, so many fail to recognize the amount of sex play indulged in by boys and girls younger than their teens. Such age-old games as "mama and papa" and "doctor" are forms of sex play, though the youngsters themselves do not always recognize it as such.

The games and sex play are harmless and, in fact, can help girls learn to adjust to males. But if parents discover children in sex play and punish them for it, they may arouse guilt feelings that will damage the child throughout life.

Grown-ups also are blamed by Dr. Kinsey for sending many an innocent man to prison as a sex offender. A little girl comes home from school and says she met a nice man who petted her or kissed her and gave her some candy. If mother promptly grows hysterical and starts the hue and cry to find the man, she is likely to inflict on her small daughter far more serious damage than any the man did. And the man, if found, may be punished though his only real offense was a kind gesture to a child.

To show how much grown-up hysteria has magnified the picture of sex crimes committed against little girls by grown men, Dr. Kinsey has the following findings: Of 4,441 girls and women, 24% had been approached before adolescence by grown men who seemed to be making sexual advances. But three-fourths of all the girls in the study had not recognized that they had ever been approached by an older male.

Among the 4,441, there was only one clear cut case of the little girl having suffered physical damage.

In nearly two-thirds of the cases Dr. Kinsey has in his study, the man's approach consisted of either talk or exposing himself. But rapists, Dr. Kinsey found in his study of male sexual behavior, very rarely start as exhibitionists.

Ever since his first study, "Sexual Behavior in the Human Male," Dr. Kinsey has been stressing the fact that our sex laws are "unrealistic, unenforceable and incapable of providing the protection" expected.

In most states, his findings show, 90% of the men and 85% of the women are regularly breaking some sex law. Enforcement of the laws obviously is not complete nor even just, since a few are penalized though many are guilty.

A whole breed of teen-age lawbreakers and blackmailers has been developed by

sex laws in many parts of the country. These are laws which penalize homosexual approaches as well as activities. Taking advantage of such laws, teen-aged boys have been known to seek satisfaction in sexual contact with men and then to blackmail and assault and murder the man, if necessary. The youth escapes legal punishment, even for the murder, by making the "specious plea" that he was protecting himself from indecent sexual advances.

A modern attempt to analyze some of the factors that may be involved in sexual behavior was recently made in a study at the New York Psychiatric Institute. The idea was to perform prefrontal lobotomy. This operation has been done on thousands of mentally sick in the hope of restoring them to sanity.

The operation consists in making a cut through the frontal lobes of the brain. The theory is that this relieves mental sickness by cutting nerve pathways responsible for unhappy or unrealistic thinking.

Dr. Walter Freeman of Washington, D. C., went to New York to do some of the operations. Dr. Freeman pioneered the operation in this country.

Dr. Kinsey and Dr. Pomeroy were asked to help evaluate the results. They agreed to do this, but insisted that two to three years would have to elapse between the pre-operation and after-operation interviews. The men they interviewed after the operation showed definite lessening of sexual responsiveness. The women did not. This, Dr. Kinsey says, is what might be expected. In the years after the operation, the men would have become less responsive because of the aging factor. This factor develops much later in women.

Gland in Head Tied to Earlier Male Sex Aging

➤ THERE IS some evidence for believing that a small gland at the base of the brain and certain body chemicals called 17-ketosteroids may have more to do with the sexual aging of men and women than the sex glands themselves.

Findings suggesting this are perhaps the most surprising of all the data on sexual behavior of 16,000 males and females acquired by Dr. Kinsey and his colleagues.

One of the few big differences Dr. Kinsey has found between men and women is in the ages at which they are sexually most responsive and active. For the human male, this is at about age 16 or 17, after which the male's sexual activity and capacity decline. Most women reach their greatest level of responsiveness in the twenties and remain on the same level to the middle fifties or sixties.

This does not appear to be correlated with any difference between the sexes in anatomy, physiology, capacity to be aroused by mental stimuli, so-called male or female hormones, or any other factor except the output and presumably production of the chemicals called 17-ketosteroids. About three-fourths of these chemicals are produced by the adrenal glands, famous because they also produce adrenalin and the arthritis remedy, cortisone.

As far as is known, male and female hormone output declines in both sexes with aging of the reproductive glands, the testes and ovaries. But 17-ketosteroid production follows the curve of sexual capacity. In the human male, it drops steadily from a peak in the late teens, when sexual capacity is at its height, to old age.

In the human female, the 17-ketosteroid production reaches a peak in the twenties, as sexual capacity does, and then drops to a plateau on which it stays for many years, declining only as she reaches her mid-fifties or sixties.

The rate of 17-ketosteroid production may be the cause of the difference in male and female sexual capacity, or it may reflect a more basic physiologic situation. Dr. Kinsey and his group do not know the answer to this yet.

Still to be answered also is the question of the exact significance of the pituitary gland in the head in male and female sexual responsiveness. This little gland has often been called the master gland of the body because of the influence it has on other glands and body functions.

In male fowl, cells in the front part of the pituitary gland gradually fill with little granules, called mitochondria, as the bird ages. There is no corresponding filling of the gland with these granules in aging female birds. This finding was made by Drs. Fernandus Payne and William Breneman of Indiana University. Dr. Kinsey points out that this sexual difference correlates with his findings on the sexual capacity and behavior of human males and females, although studies of human pituitary glands have not yet been made to show whether there is a change in them similar to that in the birds.

Men and women, boys and girls, do differ greatly in the way psychological, or mental, factors affect them sexually.

Of 33 items, from seeing nude figures to being aroused by the sight of a woman's glove or stocking, there were only three which excited more women than men. These three were commercial moving pictures, romantic literature and being bitten by her lover.

Pictures and writings intended to be sexually exciting, whether fine art and literature or scribblings and drawings on walls, are much more often produced by men for men. Only eight or ten of all the great artists who portrayed nude figures in an erotic way were women, Dr. Kinsey points out.

Getting excited by seeing some article of clothing of the other sex, which scientists term fetishism, may explain the reason why some men want to dress as women and live as women. For every 100 men and boys who are transvestites, Dr. Kinsey says there are probably no more than two or three or half a dozen women and girls with the same desire to dress and live like men. The males who wish to be identified as females are, Dr. Kinsey declares, in reality very masculine in their capacity to respond sexually to psychological stimuli.

Just as there are fewer transvestites among women, so there are fewer homosexual women than men. The Kinsey figures show 20% of girls and women have engaged in this kind of sexual activity compared to 37% of the males interviewed.

The reason women are less promiscuous than men and may go for long periods without any sexual activity is probably the fact that they are not conditioned to be excited by so many psychological stimuli.

Dr. Kinsey did find, however, that two-thirds of the girls and women interviewed had, at least on occasion, had sexually exciting dreams at night. While this means considerably fewer females than males have such dreams, and females have them less often, the fact that so many do should please the boys and men who often say they hope their girl friends dream of them at night.

Petting with boys or men is the sexual activity, of six possible types, in which the largest number of girls and women engage before marriage. Self-gratification (masturbation) is the one in which the second largest number of girls and women engage both before and after marriage.

The poets who wrote that "love is blind" and the romantic Frenchmen who spoke of "la petite mort" and "la mort douce" ("the little death" and "the sweet death") in connection with a love affair were quite right, according to the Kinsey findings.

At the climax (orgasm), besides changes in pulse rate, circulation, breathing rate and blood pressure, the senses are dulled and vision may be completely lost for a moment or two, so that there is a temporary blindness. In some persons, there is even loss of consciousness temporarily, or anesthesia.

This loss of sensation includes loss of sense of pain, which, Dr. Kinsey thinks, may explain some aspects of sadomasochism. A person may get extreme and painful punishment at the height of sexual climax without feeling anything more than mild touching.

The physical reactions in sexual climax are much like those in anger and in epileptic fits, Dr. Kinsey finds. Brain wave tracings from a person during climax (orgasm) have been made by Dr. Abraham Mosovich of Buenos Aires, Argentina. A specialist in interpretation of brain wave records would think when he first looked at this recording that it was from a patient with epilepsy, Dr. Kinsey says.

Throughout the book on female sexual behavior, Dr. Kinsey stresses the similarities of human behavior, both male and female, with that of other mammals. And he secured occasional records of girls and women, as well as of boys and men, having sexual contact with animals such as cats and dogs. The animal contacts, however, are much less for the women than the men.

TECHNOLOGY

Navy Foils Magnetic Mine

Magnetic mines menacing the Navy's metal ships can be cleared by wooden minesweepers with non-magnetic nails, engines and crews.

By ALLEN LONG

➤ THROUGH TWO world wars and a "police action" in Korea, submerged and floating mines have lurked in American military sea lanes to blow ships, cargo and men sky-high.

Unless actually hit, the mines at first were harmless to ships. But then human ingenuity created the formidable magnetic mine with which the Germans seeded the oceans during World War II. It did not have to be struck to explode. The steel of the ships set it off by a magnetic effect.

Turning the tables on the magnetic mine, the U. S. Navy has blueprinted non-magnetic ships and has ordered them into production. They are to clear "cabbage patches" from the seas so that other ships may sail through safely.

The non-magnetic minesweepers are especially designed to have no mine-triggering magnetic field. Regular iron-hulled ships are like big permanent magnets. They become magnetized to various degrees while being built.

The degree of the magnetism they pick up while under construction depends somewhat upon the way the ships are oriented with respect to the earth's magnetic field. Iron hulls also might be magnetized in scattered spots by heavy current-carrying wires running nearby to electric welding outfits.

Magnetic Field Is Trigger

When such a magnetized ship wanders too near a magnetic mine, the invisible magnetic field surrounding the ship reaches out to the mine and "squeezes" the trigger.

The tremendous force of underwater blasts has ripped out the bottom of many a vessel. And the magnetic mine's submarine victims are said to flatten out like a pancake under the impact.

During World War II, the Navy countered the menace of magnetic mines by "de-gaussing" its metal ships. Named after Karl Gauss, a German mathematician who contributed to the knowledge of magnetism, the de-gaussing system got rid of about 80% of the ship's magnetic field.

It did this through a girdle-like contraption of wire coils strapped to the hull. Current was sent flowing into the coils as the ship entered a mine field. The girdle minimized the ship's magnetic field so that chances of exploding a magnetic mine were greatly, though not entirely, reduced.

However, the amount of de-gaussing had to be checked periodically. When the vessel sailed from one part of the world to another, the current fed into the electric girdle had to be adjusted, for the magnetic field of the earth varies from spot to spot. If the precaution were not taken, this variation might affect the ship's safety around magnetic mines.

With technology raising the sensitivity of magnetic mines from day to day, the Navy has turned toward completely non-magnetic ships. The Navy *Times* reports that the Navy's "first non-magnetic minesweeper since World War II" was launched at the Fulton Shipyard at Antioch, Calif., in February, 1953.

The ship is one of 125 minesweepers of various sizes, shapes and descriptions ordered by the Navy since August of 1951.

Called the Conflict, the minesweeper has a laminated wooden hull that sports no magnetic field. The Conflict, and its unnamed sister ship now under construction, is 165 feet long and is manned by five officers and a crew of 69 enlisted men.

At Stamford, Conn., the Luders Marine Construction Company recently launched the USS Aggressive, one of the nation's greatest wooden fighting ships. It is the first in a class of seven 173-foot minesweepers.

Fashioned largely of laminated white oak, it is the largest, sturdiest sweeper of its type ever built. Not only is it reasonably elusive to the magnetic mine, but also it is said to be equipped with many secret electronic weapons of its own. The instruments, presumably used to detect magnetic mines, are said to be rendered all the more effective by the ship's wooden hull.

Non-Magnetic Engines

Iron, the "bugaboo metal" for non-magnetic minesweepers, is conspicuously absent from the Navy's specifications for non-magnetic ships. The new wooden hulls are fastened with bronze or aluminum nails unaffected by magnetism. Some minesweepers are to have nailless plastic hulls.

General Motors is building non-magnetic engines at its Cleveland Diesel plant to power the ships. The engines, similar to diesels ordinarily used on marine craft, are fashioned of bronze, copper, aluminum and stainless steel to minimize the chance of setting off a magnetic mine inadvertently. Although iron is in stainless steel, the finished metal ordinarily is non-magnetic.

It is even said that the crew is outfitted with nailless shoes and, furthermore, that it

BABY WOODEN MINESWEEPER—The salty little craft shown in the foreground is the Navy's new 57-foot MSB 5. The large reel amidship carries heavy electric cable for magnetic minesweeping operations. The baby minesweeper can be manned by seven enlisted men who will spend most of their time aboard a larger ship still in design stages.

is prohibited from carrying pocket knives and other metallic objects that might influence the sensitive instruments carried aboard the ships.

However, a Navy ship designer in Washington said it sounded to him as though that was "going overboard a bit on this non-magnetic business."

The magnetic mine is, perhaps, the most dreadful member in the family of underwater ship-killers. Unlike anchored mines that explode upon contact with a ship, the magnetic mine lurks in shallow waters on the ocean or river bottom.

Mine-Sweeping Methods

Such mines cannot be swept clear by ordinary methods. Instead they require special magnetic methods.

When the British first learned that magnetic mines were being used against them during World War II, they outfitted Wellington bombers with a large wire-filled hoop. The hoop encircled the plane's engines, nose and most of the fuselage.

A special generator carried in the plane created current that was fed into the hoop. The device then became a flying electromagnet. When the futuristic-looking aircraft flew near enough to a magnetic mine for the hoop to be effective, the mine exploded. The blast rocked the airplane and jarred the crew, already nauseated by fumes from the auxiliary engine powering the generator.

Special Cable Proposed

At that time, methods of exploding magnetic mines were discussed at length in British pubs and restaurants as well as in defense quarters.

William Dubilier, inventor of the mica condenser widely used in radios, suggested that a cable be strung across Britain's rivers. Powerful electric generators would pump surges of current into the cable periodically. The idea was to explode the magnetic mines inside the German submarine before the mines could be laid. This not only would "take care" of the mines but the sub and its crew as well.

However, since even magnetic mines are outfitted with a safety device that keeps them from becoming "armed" until desired, it is questionable whether such a scheme would work.

Minesweepers ordinarily clean out "cabbage patches" by snipping the anchor wires of the mines. The mines leap to the surface and can be exploded by rifle fire. To cut the wires, minesweepers often work in pairs with a big loop of cable trailing between them.

A British device permitted the minesweeper to work independently. The mines were thrust aside of the ship by a cable arrangement which guided them to a clipper. The clipper snipped the mine anchor wire.

Americans watched for mines with radar. Spotted mines were reported immediately to military authorities and were charted so that other ships could look out for them.

In addition to the magnetic mine, the Nazis were reported to have a host of other special-purpose mines. One such mine was tuned to the sounds emitted by ship propellers as they beat against the water. It exploded when a vessel throbbed overhead.

A drifting mine, like a huge death-laden egg, was laid on the incoming tide. Slowly it settled into place in a harbor or river mouth, then sent down its anchor and became "armed." But scientists, noting the difficulty of suspending objects in water, questioned the validity of reports describing the drifting mine.

Another vicious mine reported during World War II was called the Leon. This devilish device made waters unsafe for submarines crawling along the ocean bottom as well as for troop carriers skimming along the surface. The mine, reportedly propeller driven, slowly rose and fell like a yo-yo along an imaginary string. It was particularly hard to clear from waters because it had no anchor line.

As one side brings out new weapons against the other, it seems that an effective defense is quickly found. One answer to the menace of the magnetic mine is the non-magnetic minesweeper equipped with mine-finding instruments. When this defense becomes so effective that the magnetic mine no longer worries the enemy, then something new must be created.

The next thing for military scientists to figure out seems to be what sort of mine will supersede the murderous magnetic monster.

Science News Letter, August 22, 1953

PSYCHOLOGY

Blind Child Needs Time

➤ WHEN A baby is born blind, it is a great shock and grief to his parents. But the baby himself does not know what seeing is, so he does not know what he is missing. So he is as content as other babies.

By the time he realizes that he cannot see, he can have grown into a happy person able to meet life as well as any child.

Whether or not he does grow this way depends largely on how his parents handle him. Other children in the family, aunts and uncles and grandparents and friends and the neighbors all can help, too. Ways in which they can help are given in a booklet published by the U. S. Children's Bureau, called "The Preschool Child Who Is Blind" (see SNL, Aug. 15, p. 108).

The first and last lesson for the parent of the blind child, according to this booklet, is:

Believe in him and have confidence that he can have a good life. Give him love, affection, good health. See to it that he is taught the skills and has the experiences that will develop his many abilities.

Blind children are mentally about like other children. They can learn to do things such as feeding themselves, dressing themselves, helping mother with the dishes and so on, at about the same age as other children. Blind children may be slower, take longer to do and to learn. This does not necessarily mean they are less bright.

The child who can see and hear sees his mother drop a toy into a box, for example, and hears it drop in. He imitates what he sees and hears. The blind child only hears, so unless mother lets him feel what she is doing as she tells him and does it, he will be slower learning to do it.

Blind babies enjoy play and attention just like seeing babies. Pick up the blind baby often, dance him on your knee, romp with him. He will laugh and dimple and coo just like a seeing baby. Remember, however, to let him know when you are going to pick him up, because since he cannot see you come to him, he may be frightened if he does not get some warning.

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INVENTION

Patent Given to Ultrasonic Dishwasher

➤ SAMUEL BAGNO of Astoria, N. Y., has told patent office officials that he is able to cleanse dishes without hot water, soaps, or even abrasives such as ordinary scouring powders. Furthermore, he reported he could attain a "relatively high degree of sterilization even when using domestic cold water."

He was describing his ultrasonic dishwashing method, now protected by patent No. 2,647,846.

Mr. Bagno's dishwasher consists of a tank that discharges to a drain. Water is fed into the bottom of the tank through a tube running to a faucet. The water is turned off and on at a rate of 20,000 to 40,000 times a second by a special device. This sets up tiny pressure waves in the tank that snatch food away from the utensils. The dishwasher makes no noise because the water flow is interrupted so rapidly that human ears ordinarily cannot hear it.

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AN ANALYSIS OF SOME PHYSICAL FACTORS AFFECTING THE LOCAL DISTRIBUTION OF THE SHORTTAIL SHREW (BLARINA BREVICAUDA) IN THE NORTHERN PART OF THE LOWER PENINSULA OF MICHIGAN—William O. Pruitt, Jr.—*University of Michigan Press*, 39 p., illus., paper, 60 cents. The author has come to believe that animals which winter in a region usually covered by an extended polar air mass have a more stable bioclimate than do the same kinds farther south.

COPPER FUNGICIDE—Dean S. Hubbell—*Mellon Institute*, 4 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Describing tests on plants.

EDUCATORS GUIDE TO FREE SLIDEFILMS—Mary F. Horkheimer and John W. Diffor, Eds.—*Educators Progress Service*, 5th ed., 185 p., paper, $4.00. This new edition lists 609 titles. Of these 177 are new since the last edition.

FOUR CENTURIES OF EUROPEAN JEWELLRY—Ernle Bradford—*Philosophical Library*, 226 p., illus., $12.00. An historical survey of jewelry from the Renaissance to today's use of new precious metals, the various techniques used in preparing and mounting jewels and precious stones, and the processes of making jewelry.

FREEDOM AND PLENTY: Ours To Save—Wilfrid S. Bronson—*Harcourt, Brace*, 124 p., illus., $2.95. Telling children what they can do to spare our natural resources.

FRIEDRICH FROEBEL AND ENGLISH EDUCATION—Evelyn Lawrence, Ed.—*Philosophical Library*, 248 p., illus., $5.00. Essays on the man and the influence of his beliefs and work on the primary school systems of today.

FROM ART TO SCIENCE IN ENVELOPE MANUFACTURING—P. B. Davidson—*Mellon Institute*, 3 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Discussing the application of the science of high polymers to paper.

GOVERNMENT OWNED INVENTIONS AVAILABLE FOR LICENSE—Office of the Chairman, Government Patents Board—*Govt. Printing Office*, 167 p., paper, $1.00. Listing 3,658 government-owned inventions which are available to the public for industrial use. They may also serve as a fertile source of new ideas. The patents are arranged by fields, and the patent number is included in each case.

INTRODUCTION TO ELECTRON MICROSCOPY—Cecil E. Hall—*McGraw-Hill*, 451 p., illus., $9.00. An introductory text, for the formal student and for the self-instructed, based on the course at MIT.

MICROBES AT WORK—Millicent E. Selsam—*Morrow*, 95 p., illus., $2.00. To tell children about microbes, especially the kinds that are useful to man.

PRACTICAL TAXIDERMY: A Working Guide—John W. Moyer—*Ronald*, 126 p., illus., $3.00. Intended especially for the amateur or beginner. Instructions are intended to be easy to follow, even for the novice.

PROGRESS IN AIR POLLUTION CONTROL—W. C. L. Hemeon—*Mellon Institute*, 9 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Telling what has already been accomplished and plans for the future.

A PROPOSED SEALED CIRCULAR COAL-REFUSE PILE—William L. Nelson and Ernst P. Hall—*Mellon Institute*, 5 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Mine operators are now growing concerned with the need to pile refuse in such a manner as to prevent spontaneous ignition.

REFINING OF OILS AND FATS FOR EDIBLE PURPOSES—A. J. C. Andersen—*Academic Press*, 204 p., illus., $7.00. Some animal fats, such as suet and lard and some vegetable oils, when rendered by appropriate methods, can be used for food without further treatment, but in many cases they must be further refined to remove impurities or traces of toxic materials.

SALT RISING BREAD AND PRACTICAL COMPARISONS WITH OTHER BREADS—R. N. Kohman—*Mellon Institute*, 1 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. This kind of bread, exceptionally fine grained and almost cake-like in quality, is made without yeast. Temperature control and other conditions for baking are given.

SCIENTIFIC RESEARCH AS IT PROCEEDS IN MELLON INSTITUTE 1952-1953—Edward R. Weidlein—*Mellon Institute*, 52 p., illus., paper, free upon request direct to the publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. During the year, the Institute's expenditures for pure and applied research amounted to $4,099,405. The projects are here reviewed.

SMALL PARTICLE STATISTICS: An Account of Statistical Methods for the Investigation of Finely Divided Materials—G. Herdan with a guide to the experimental design of particle size determinations by M. L. Smith—*Elsevier*, 520 p., $12.00. "This 'region of lost dimensions,'" the author explains, "has, to some extent a statistics of its own." The particles treated are those in the sieve and sub-sieve range.

THE TROPICAL WORLD: Its Social and Economic Conditions and Its Future Status—Pierre Gourou translated by E. D. Laborde—*Longmans, Green*, 156 p., illus., $3.50. Dealing with population density, ill health and other problems of lands having mean temperatures of at least 65 degrees Fahrenheit and plenty of rain.

WHAT'S ENGINEERING? — *Stevens Institute of Technology*, 16 p., illus., paper, free upon request direct to the publisher, Fifth and Hudson Sts., Hoboken, N. J. Designed to answer questions about the work engineers do, and the scholastic attainments and special aptitudes that indicate whether a student should seek admission to an engineering college.

ZOO BABIES—William Bridges—*Morrow*, 95 p., illus., $2.50. Whether you are old or young you will enjoy these endearing baby animals portrayed in photographs and charming text.

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METEOROLOGY

Congress Seeks Advice on Rain-Making Legislation

► GOVERNMENT CONTROL of rain making is a long way off. However, the U. S. now has a law setting up a committee to study the feasibility of weather modification. It is called the Federal Weather Control Committee, and President Eisenhower signed legislation setting it up on Aug. 13.

Introduced by Sen. Francis Case (R.-S.D.) and others, the act sets up an 11-man Congressional weather modification advisory committee, six from government departments and five from private life. The committee would be required to report periodically to Congress, by way of the President, with a final report due no later than 1956.

Western ranchers and farmers are spending hundreds of thousands of dollars a year on efforts to make it rain. Although many of them believe this money is well spent, the Weather Bureau, backed by close to 100 years of records and research, can usually tell them that it would have rained without the rain maker's efforts. And many proponents of rain making state that they can only make rain when weather conditions are such that it probably would have rained anyway.

The weather advisory committee, under the terms of the bill, is to make a study of artificial weather control and the status of scientific experiments in order to come up with recommendations as to what control legislation might be needed.

The committee is given power to subpoena records, thus forcing disclosure of commercial rain makers' scientific data.

Government agencies represented on the committee will be the Departments of Commerce, Defense, Agriculture, Interior, and Health, Education and Welfare, and the National Science Foundation.

The five individuals on the committee are to be selected by the President from among outstanding leaders in science, agriculture and business.

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FORESTRY

Fight Forest Fires With Water Bombs

➤ NEW METHODS for speeding up forest fire fighting in the vast reaches of Ontario province have been developed over the past year by the Ontario Department of Lands and Forests.

More than 40 modern single-engined aircraft, especially designed for work in the lake-studded Canadian forests, are used in conjunction with the new methods.

A way of bombing forest fires with water from the air was devised last season, and this year most of the aircraft fleet is equipped with the water-bombing release mechanism. For water-bombing, especially developed paper bags that hold water are used.

Parachutes are used to drop firefighting equipment to forest rangers on the ground to supply men with food and other essentials at base camps and at fireline posts.

After experimental use last summer, Polaroid quick-print type cameras are being used this year from patrol aircraft. The prints delivered to chief rangers from these cameras help determine the starting points of fires, spot the type of fuel and territory involved, and assist in quickly planning effective fire control measures.

Airborne loudspeakers can be used to instruct ground crews fighting fires, to direct persons lost in the northern brush and to broadcast fire hazard warnings.

To shuttle fire-fighting crews from water areas where they are landed by patrol aircraft to distant fire sites, helicopters will be used whenever possible.

Since they could hover over a specific site, helicopters were used successfully last year for fire observation and fire control from the air.

A new type of caterpillar pack tractor will be used this year by ground fire crews to tote loads up to 700 pounds at walking speed over all types of rough terrain. This will allow fire-fighters to arrive at the scene of a forest fire in condition to fight the fires without a rest, where formerly they had to pack their equipment in on their backs. The pack tractors were developed by the department.

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ZOOLOGY

NATURE RAMBLINGS

Familiars of Satan

➤ RATS APPEAR in many late medieval and early modern paintings as familiars of warlocks and witches, and even of the Devil himself—and quite appropriately so.

There is hardly any living creature that follows man more ubiquitously, damages his possessions in more fiendishly ingenious and persistent ways, or is capable of bringing death to him in more terrifying form.

Ancient Babylonians had a god of flies—Beelzebub, the Baal of Buzzing Things. The concept of such a disgusting deity probably arose out of a primitive instinct to propitiate that which you find you cannot combat.

That they had no god of rats may seem strange, until it is realized that they had no rats. Rats, though probably Asiatic in origin, did not achieve their present world-wide distribution until the rise of world-wide commerce. Rats are natural beach-combers; and they will jump ship wherever the pickings ashore look good.

Rats' destructiveness to property is reckoned in simply fantastic multiples of millions. Any good-sized city could easily maintain a municipal university on what rats devour, spoil and set fire to.

Rats live in filth and are generally menaces to health. Their greatest danger comes from the fact that the fleas which they harbor are the natural carriers of that most terrible of Asian scourges, bubonic plague.

Man has long been almost helpless in the face of rats, for they can be kept down only at the cost of constant and highly expensive eradication campaigns. Within the past few years, however, rodenticides have been developed that at least seem to provide man with proper weapons in the hitherto hopeless fight.

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A British Army officer reports that some Malayan *termites* can devour a pair of muddy boots in a night, leaving only nails and studs.

The house *wren* has been known to feed its young 1,200 times a day, principally with insects.

TECHNOLOGY

Listen in on Insect Larvae in Grain Kernels

➤ A RAPID method for detecting insect infestation of grains in storage bins may come soon, following the development of a device that listens for minute insect larvae hidden within the kernels.

The electronic listener, consisting of a low noise level audio amplifier and a suitable microphone and loudspeaker, picks up the sound of insect larvae and pupae as they move and feed inside grain kernels placed in a soundproof box. A record of the sound patterns can be made on an oscilloscope.

Drs. R. E. Adams, J. E. Wolfe, Max Milner and J. A. Shellenberger of Kansas State College report development of their listener in *Science* (Aug. 7).

Before the development of the listener, a normal delay of several weeks after fumigation of stored grains—time for emergence of surviving insects—was necessary to determine the effectiveness of the fumigation. However, with the listener, immediate detection of hidden surviving insects is possible.

Already under construction, the scientists said, is a listener to check fumigation effectiveness in mills and grain elevators.

A listener might be developed for large storage bins, they suggested, which would give a constant check on insect infestation within the bin without sampling or removing grain. This would work much like the permanent thermocouple systems now used in storage bins to give a constant check on heating of stored grains.

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Questions

CYTOLOGY—How can movies help in the study of disease viruses? p. 116.

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EDUCATION—How can Indians who do not read their own language be taught English? p. 117.

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PHYSICS—What is the water-weight equivalent of the core of a nucleus? p. 117.

How many cubic miles does warning radar scan? p. 118.

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PUBLIC HEALTH — What are symptoms of tuberculous meningitis? p. 116.

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TECHNOLOGY—How can magnetic mines be foiled? p. 123.

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VITAL STATISTICS — What will the average lifespan soon be in the U. S.? p. 125.

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Photographs: Cover, George A. Smith; p. 115, Consolidated Vultee; p. 117, Robert Cox; p. 119, Dellenback; p. 123, Potomac River Naval Command; p. 127, University of Illinois; p. 128, Brevel Products Corp.

ANCIENT CEREMONIAL ROOM—The kiva of the prehistoric Sinagua Indians of Arizona is the first ceremonial room found in this culture, and may relate it to the later Hopi Indians. The room was excavated by University of Illinois archaeologists working in cooperation with the University of Northern Arizona.

ARCHAEOLOGY

Indians Before Hopis

➤ A LINK between the ancient people known to archaeologists as the Sinagua people and the later Hopi Indians has been found by an archaeological party digging under the direction of Prof. John C. McGregor of the University of Illinois. They have been searching the remains of a village 600 to 700 years old some 50 miles southeast of Flagstaff, Ariz.

Among the seven rooms they have explored in this 40-room village they found a very unusual ceremonial room, or kiva, which, Prof. McGregor said, had many characteristics like those of the Hopi people's kivas. Most kivas found in the Southwest are circular, but the Hopi used a ceremonial room very different in shape—it was rectangular.

The rich culture of the Sinagua people, Prof. McGregor indicates, may have been due to an accident of nature. An eruption 1,000 years ago of the volcano now known as Sunset Crater spread ashes several inches deep over a 45-mile territory. This made the soil so fertile that the corn-growing Indians of the region had new leisure to develop their arts. Among their materials are beautiful pottery and exquisite jade mosaic work.

More than 6,000 pieces of pottery were collected by the expedition this summer. They also uncovered the bones of an infant and of a young person, each buried with three ancient pots, and of an adult buried with seven pots, four copper bells, four large shell bracelets and many other items.

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ENTOMOLOGY

Hummingbird Moth Flies During Day

See Front Cover

➤ AN EXCEPTION to the rule that moths usually fly at night and are inactive during the day is the clearwing thysbe, or hummingbird moth, shown on the cover of this week's SCIENCE NEWS LETTER.

Frequently this moth, *Hemaris,* is mistaken for a hummingbird because of its darting flight and its habit of remaining poised at a flower while feeding. The hummingbird moth is readily identified by its yellowish-green color and the band of brown around its body.

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The whirring of an electrically operated silo unloader is the only sound needed to call *cows* to dinner on a New York farm; the machine unloads ensilage on a conveyor belt that carries the food to the animals.

AVIATION MEDICINE

Lack of Gravity No Space Flight Hazard

➤ AT LEAST twice U. S. Air Force experimenters have produced a no-gravity situation for jet pilots.

Although test results are inconclusive, they indicate that a lack of gravity will not severely harm the mind or body of the interplanetary man of tomorrow, the astronaut.

Dr. Siegfried J. Gerathewohl of the Air Force School of Aviation Medicine at Randolph Field, Tex., reported to the Fourth International Astronautical Congress meeting in Zurich that no ill effects of any consequence were noted after the tests were ended.

Two groups of flights were made: one by Test Pilot Burt Crossfield at Edwards Air Force Base, Calif., for the National Advisory Committee for Aeronautics; the other by personnel of the Aero Medical Laboratory at Wright-Patterson AFB, Ohio.

A weightless state was maintained up to 42 seconds as the planes swished through the sky, following a carefully worked out path. Mr. Crossfield said he noted a sensation of "befuddlement" during the first no-gravity flights of the group, but this later was overcome.

This weightless state may still be a serious problem, Dr. Gerathewohl reported. However, human reaction to it was entirely different from the reaction of mice sent up in rockets last year by Dr. James P. Henry and a group of associates from the Aero Medical Laboratory. (See SNL, Oct. 11, 1952, p. 230.)

The mice definitely were disturbed by the absence of gravity. Some clung to the floor of their cage, others reached out desperately to find some support. Dr. Gerathewohl predicted space passengers might react in the same way.

More experimental flights must be run under carefully controlled conditions before physicians and psychologists can determine precisely what physical and psychological reactions occur in the human body when gravity is removed.

Science News Letter, August 22, 1953

A *bird's eye* has a third eyelid which keeps the eye moist; it also doubles as a light filter.

· New Machines and Gadgets ·

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 688. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

GOLFER'S AID stores 15 practice or regulation balls in a hopper and feeds them one-at-a-time to a rubber tee when the delivery tube is depressed. Mounted on an "indestructible" baseboard, the gadget permits golfing enthusiasts to practice in basements, dens or on the driving range.

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CARPET PADDING now is being made in England out of foam rubber bound to a sheet of strong burlap-like material. Easily cut with shears, the springy padding does not creep, or permit carpets to creep over it. It is moth- and damp-proof and deadens sound. Dust seeps through the padding to the floor where it can be easily taken up with a vacuum cleaner.

Science News Letter, August 22, 1953

TIRE REMOVER strips heavy tires from truck wheels, making easy this operation in garages and repair shops. Working in combination with a hydraulic jack, the machine is said to have a long, maintenance-free life.

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ELECTRIC BARBECUE slowly turns a 15-pound roast, two chickens or a large turkey over the fire while the chef frolics with his guests in the back yard. The spit, which is shown in the photograph, can be adjusted to four positions from the fire as needed. Special attachments are available for broiling steak and shish kebab.

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ADSORPTION-TYPE dehumidifier plugs into standard household electrical outlets and circulates air through special chemicals. The chemicals adsorb moisture from the air, reducing dankness in basements, playrooms, storage rooms or beach homes. When exhausted, the chemicals are electrically and automatically reactivated. The machine requires no personal attention, the maker reports.

Science News Letter, August 22, 1953

YARNS OF a new polyester fiber now are available for knitting housewives to use. The colorful yarns produce garments that wear well, resist shrinking, bagging, stretching and mildew, and that are not attacked by moths. They can be used in regular yarn patterns without adaptations.

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AUTOMATIC OILER screws on to machinery and holds a quart of oil in a transparent butyrate plastic reservoir that feeds into an attached bowl. A special device regulates the drip rate for any interval between 10 seconds and 10 minutes. Copper tubing can be installed to carry the oil drops directly to the point to be lubricated.

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AEROSOL INHALANT, sprayed from its can, helps to bring relief to poultry suffering with "colds" and bronchial congestions. Containing mineral oil, pine oil, triethylene glycol, oil of camphor, oil of eucalyptus, menthol and thymol, the inhalant is said to loosen mucus in the nostrils and mouths of poultry.

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Do You Know?

The mere addition of a 17-pound windshield wiper on a combat aircraft can result in an overall increase of 127 pounds in the weight of the *plane*, and an increase of $5,000 in its price.

Bad spark plugs are one of the chief causes of excess *fuel consumption* in a tractor or automobile engine.

One gravity measuring *instrument* is so sensitive it gives two different readings on (1) the top of a book and (2) the surface upon which the book is resting.

The sky-scraping *giraffe* has only seven vertebrae in its neck.